

Conference Abstract

Specimens in a Broader Context: The National Ecological Observatory Network and the extended specimen

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Abstract

Community innovations in both specimen digitization (e.g., [Morphbank](#); [SlideAtlas](#); [Inselect](#), Hudson et al. 2015) and data standards (e.g., the National Science Foundation initiative "Advancing Digitization of Biodiversity Collections", Page et al. 2015, Nelson and Shari 2019; [Darwin Core](#) (Darwin Core Task Group 2009)), have resulted in digitized specimens with rich contextual metadata and the capacity to share such specimen information widely. These extended specimens have allowed for the exploration of cross-scale research questions that traverse multiple taxonomic, spatial and temporal scales. As a relatively new collection organization, the National Ecological Observatory Network (NEON; Keller et al. 2008) has curated and archived >200,000 specimens to date and is projected to archive between 80,000 and 120,000 specimens annually through its 30-year, continental-scale environmental monitoring program. NEON has embraced the Extended Specimen paradigm (introduced by Webster 2017; NEON's implementation described in Lendemer et al. 2020), and each sample is physically and digitally curated from the point of collection enabling sample discoverability that maximizes specimen Findability, Accessibility, Interoperability, and Reusability (the FAIR standard; Wilkinson et al. 2016). All archived specimens are associated with precise spatial and temporal information and (where available/applicable) NEON also integrates specimen images, morphometrics, genetic sequences and taxonomic data with the specimen records within a

[Symbiota](#) platform. Any additional analyses or derived specimens created by the research community are also linked in the specimen record. NEON has benefited substantially from community development of tools and standards, but the process of data integration has not been without problems. Here, we will discuss challenges NEON has faced in the implementation of the extended specimen as well as solutions.

Keywords

samples, collections, metadata

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References

- Darwin Core Task Group (2009) Darwin Core. Biodiversity Information Standards (TDWG). (Kampmeier G, review manager). URL: <http://www.tdwg.org/standards/450>
- Hudson LN, Blagoderov V, Heaton A, Holtzhausen P, Livermore L, Price BW, Walt S, Smith VS (2015) Insect: automating the digitization of natural history collections. PLOS ONE 10 (11): e0143402. <https://doi.org/10.1371/journal.pone.0143402>
- Keller M, Schimel DS, Hargrove WW, Hoffman FM (2008) A continental strategy for the national ecological observatory network. The Ecological Society of America 282-284. URL: <https://www.fs.usda.gov/treesearch/pubs/30433>
- Lendemer J, Thiers B, Monfils A, Zaspel J, Ellwood E, Bentley A, LeVan K, Bates J, Jennings D, Contreras D, Lagomarsino L, Mabey P, Ford L, Guralnick R, Gropp R, Revelez M, Cobb N, Katja Seltmann MCA (2020) The Extended Specimen Network: A Strategy to Enhance US Biodiversity Collections, Promote Research and Education. BioScience 70 (1): 23-30. <https://doi.org/10.1093/biosci/biz140>
- Nelson G, Shari E (2019) The history and impact of digitization and digital data mobilization on biodiversity research. Philosophical Transactions of the Royal Society B - Biological Sciences 374: 20170391. <https://doi.org/10.1098/rstb.2017.0391>
- Page LM, MacFadden BJ, Fortes JA, Soltis PS, Riccardi G (2015) Digitization of Biodiversity Collections Reveals Biggest Data on Biodiversity. BioScience 65 (9): 841-842. <https://doi.org/10.1093/biosci/biv104>
- Webster M (Ed.) (2017) The Extended Specimen: Emerging Frontiers in Collections-Based Ornithological Research. CRC Press

- Wilkinson M, Dumontier M, Aalbersberg I, et al. (2016) The FAIR Guiding Principles for scientific data management and stewardship. Scientific Data 3 (160018). <https://doi.org/10.1038/sdata.2016.18>